



1108 West Evelyn Ave., Sunnyvale, CA 94086
 Cage Code: 0ZHS4
 (408) 735-7137
 files@protoexpress.com
 www.protoexpress.com

Certificate of Compliance

Customer	The University of Arizona	Revision:	2.0
Address	1303 E University Blvd, Box 5 Tucson AZ 85719	Date Code	2040
Part Number	GUSTO-UA-DWG-00012	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422295 - 1,00
Sierra Tool Number	171652	Date Shipped	10/7/2020
Number of Layers	8		
Surface Finish	HAL		
Quantity of PCB Shipped:	5		

(Plus solder sample if required.)

Compliance to:

Master Drawing	None		
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3	and IPC-1601, IPC-A-600 (latest revision)	
Lead Free	No	NASA Outgassing	No
RoHS / REACH *	Yes, with exception of Lead in surface finish.	Positive Etch Back	No
UL	---	Halogen Free	No
Special ID, marking, comments	None		

Specific paragraphs and inspection items:

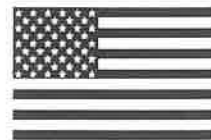
	IPC-6012	
3.2 Material		Conductor Surfaces
Visual		3.3.8 junction of gold plate to solder finish
3.3.1 Edges of Printed Board		3.5.4.1 Nick, dents, pinholes
3.3.2 Laminate Imperfections		3.4.4.5 - 7 Dewetting / nonwetting / final finish coverage
3.3.3 Plating and Coating Voids in the Hole		3.5.4.4 Edge printed board connector
3.3.4 Lifted Lands		3.5.4.2 Surface mount
3.3.5 Marking and Traceability		Physical
3.3.9 Workmanship		3.3.7 Plating adhesion
Solderability		3.7.2 Solder mask cure and adhesion
3.3.6 Surface		Structural Integrity After Thermal Stress
3.3.6 Plated Through Holes		3.6.2.1 Plating integrity
Dimensional		3.6.2.3 Laminate voids
3.4 Printed Board Dimensional		3.6.2.6 & 8 Etchback / negative etchback
3.4.1 Hole Size		3.6.2.9 Annular ring and Breakout (internal)
3.4.1 Hole Pattern Accuracy		3.6.2.10 Lifted Lands
3.4.1 Pattern feature accuracy		3.6.2.11 Hole plating thickness
3.4.2 Annular ring (external)		3.6.2.15 Surface plating and conductor thickness
3.4.3 Bow and twist		3.6.2.14 Copper foil thickness (internal)
3.7 Solder Mask Coverage		3.6.2.16 Metal core spacing
3.6.2.11 Plating / coating thickness		3.6.2.17 Dielectric thickness
Conductor Width & Spacing		3.6.2.18 Material fill of Blind and Buried Vias
3.5.1 Internal and External Width		Cleanliness
2.5.2 Internal and External Spacing		3.9.1 Cleanliness prior to solder mask application
		Foreign Object Debris (FOD)

The above order has been both visually inspected, microsection, tested, and conformed to the customer specification, customer's master drawings, and purchase order.

All material used in the manufacture of the above order meet the material and manufacturing specifications as specified on the customer's drawings and purchase order subject to subsequent communication / agreement. Sierra Circuits hereby certifies that the item was last substantially transformed ("Substantially Transformed") in the United States of America. Sierra hereby certifies that the information is accurate and TAA Compliant, which is defined to mean that the article is wholly the growth, product or manufacture of the U.S.A. or Substantially Transformed in the U.S.A.

"RoHS / REACH" Compliant: Manufactured to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as regulated by the European Union dated 18 December 2006. Furthermore, they do not contain any of the 174 materials that are considered substance of very high concern (SVHC), updated on July 7, 2017 (refer to URL <http://ec.europa.eu/environment/>)

MADE IN



U. S. A.

Harpal Pandher

Inspector

October 7, 2020

Date



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Boards Shipped to IPC Specifications

Customer: The University of Arizona	Tool Number: 171652	SN Range:	Boards shipped per C of C =
Address: 1303 E University Blvd, Box 5 Tucson AZ 85719	Work Order: 422285 - 100	from: 1	Boards shipped per this form =
Part #: GUSTO-UA-DWG-00012	Revision: 2.0	to: 3	
PO #: 55927/line 3, COIN 24101	Date Code: 2040		IPC-6012 Rev D, Amd 1, Class 3

Delete the board serial numbers that did not ship.

Panel SN#	Board SN#	7	8	9
S/N: 1				
S/N: 2	2	4		
S/N: 3				

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Electrical Test Certificate of Compliance

Customer	The University of Arizona	Revision	2.0
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	Date Code	2040
Part Number	GUSTO-UA-DWG-00012	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422295 - 1.00
Sierra Tool Number	171652	Date Tested	10/7/2020
Number of boards Passed	25	Boards shipped might be less then the boards that passed electrical test.	

Compliance to:

Master Drawing	None
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3
Test Level	C
Test Method	Resistive

Test Stamp:

Stamped on PCB

Resistive Test Parameters:

Isolation (Shorts/Leakage) Meg Ohms	10
Continuity (Open)	10
Voltage	40
Adjacency Used	Yes
Horizontal Distance	0.05
Vertical Distance	0.05
Source Data Used	Net List from Gerber Data
Additional Comments	None



High Potential (Hi-Pot):

Voltage	No Requirement
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Comments or addition results: None

Sierra Circuits, Inc. certifies that this work order has been electrically tested in accordance with IPC-9252 "Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards" The above order has been electrical tested, and conformed to the order specifications and the customer's drawings & purchase order.

710-Mandeep Kaur

October 7, 2020

Inspector

Date



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Certificate of Compliance - Dimension

Customer The University of Arizona
 Address 1303 E University Blvd. Box 5 Tucson AZ 85719
 Part Number GUSTO-UA-DWG-00012
 Purchase Order # 559272/line 3, COIN 24101
 PCB Type Type 3
 Sierra Tool Number 171652

Lot Conformance Inspection (LCI)

Revision 2.0
 Date Code 2040
 Manufactured Work Order 422295 - 1.00
 Number of Pnl in Work Order 3
 Number of Bds Released 27
 Boards per Panel 9
 Sample Size Required 3

Compliance to:

Master Drawing None
 Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

Disposition: Accept Reject

Comments:

Harpal Pandher

October 7, 2020

Inspector

Date

Item	Nominal (Print Spec)	Tolerance		Measurement from Boards					Measurement Tool Serial Number & Calibration Date
		+	-	Board #1	Board #2	Board #3	Board #4	Board #5	
1	5.150	0.005	0.005	3-002 5.153	3-004 5.153	3-007 5.153			caliper/dr7305/05/20/21
2	4.680	0.005	0.005	4.680	4.680	4.680			caliper/dr7305/05/20/21
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									



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Certificate of Compliance - Bow & Twist

Customer The University of Arizona
 Address 1303 E University Blvd, Box 5 Tucson AZ 85719
 Part Number GUSTO-UA-DWG-00012
 Purchase Order # 559272/line 3, COIN 24101

Lot Conformance Inspection (LCI)

Revision: 2.0
 Date Code 2040

Board Length 5.15 inches
 Board Width 4.68 inches
 Panels in lot 3
 # of Samples 3

Sierra Tool Number 171652

Work Order 422295 - 1.00

Compliance to:

Master Drawing None

Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

Design Surface mount components

Specification 0.75%

Bow									
Board #	S/N #	Length (L)	Width (W)	Go/No-Go gauge	Go/No-Go gauge	Max. height off	Max. height off	% Bow _L	% Bow _W
				for sample length	for sample width	table along Brd	table along Brd		
				R _L	R _W	length (inches) R _L	width (inches) R _W		
1	3-002	5.150	4.680	0.039	0.035	0.000	0.000	0.00%	0.00%
2	3-004	5.150	4.680	0.039	0.035	0.000	0.000	0.00%	0.00%
3	3-007	5.150	4.680	0.039	0.035	0.000	0.000	0.00%	0.00%
4									
5									

Calculations for Bow:

$R_L = L (B) / 100$ $\% \text{ Bow}_W = (R_W / W) \times 100$
 $R_W = W (B) / 100$ $\% \text{ Bow}_L = (R_L / L) \times 100$

Where:

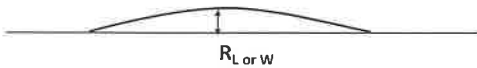
R_L = Go/No-Go feeler / pin gage size for sample length
 R_W = Go/No-Go feeler / pin gage size for sample width
 L = Board Length measurement
 W = Board Width measurement
 B = Maximum allowable Bow %

Calculations for Twist:

$\% \text{ Twist} = (R / (2 \cdot D)) \times 100$

Where:

L = length of board (inches)
 W = width of board (inches)
 R₀ = max. height off table along diagonal board length (inches)
 D = diagonal board length (inches)
 R = max. corner height above table (inches)



Note: Any R values of 10 mils or less are considered negligible and are listed as "0"

Twist						Overall Rating	
Board #	S/N #	Diagonal Length (D)	Go/No-Go gauge	Max. corner	% Twist	Bow & Twist	Remarks / Comments
			for sample length	height above			
			R _D	table (inches) R		Pass / Fail	
1	3-002	6.959	0.104	0.000	0.00%	Pass	
2	3-004	6.959	0.104	0.000	0.00%	Pass	
3	3-007	6.959	0.104	0.000	0.00%	Pass	
4							
5							

Measurement Tool Used	granite surface	Serial Number	AA0474	Calibration Date:	1/20/2021
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Comments:

Any board rejection requires 100% sort and retest.

Harpal Pandher

Inspector

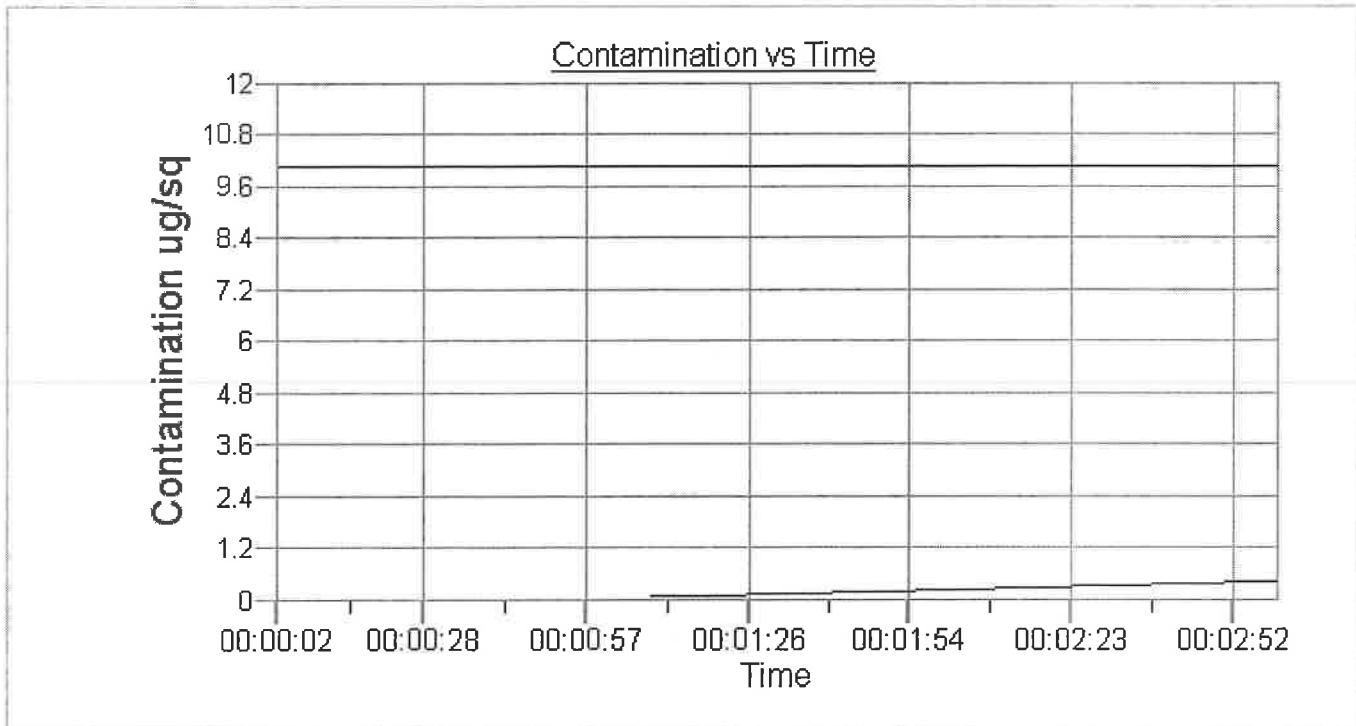
October 7, 2020

Date

Sierra Circuits
1108 West Evelyn Avenue
Sunnyvale, CA 94086
Ionic Contamination Testing Report



Test Description:	Test Oct07,20 115434		
Name:	THE UNIVERSITY OF ARIZONA	Nomenclature:	171652
Status:	Passed	Part Number:	GUSTO-UA-DWG-00012:2.0
Result:	0.43374 ug/Square	Comment:	FINAL
Start Time:	11:54:34	Length:	5.15
Total Run Time:	00:03:00	Width:	4.68
Test Type:	Dynamic Test	Area:	48.2
Test Date:	10/7/2020	Termination:	Automatic
Baseline Resistivity:	324.42 MΩ-cm	Duration:	NA
Final Resistivity:	273.78 MΩ-cm	Sensitivity:	2
Temperature:	44.9 Degree C	%IPA:	76.6
Lot / Part No:		Failpoint:	10.06 ug NaCl/sq
User:	QC		



Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:
 Insulectro
 20362 Window Drive
 Lake Forest CA 92630

Quality Certificate

Date
 07/28/2020
 Purchase order item/date
 100243581 1 / 07/21/2020
 Shipping plant
 Isola Ridgeway, USA
 Delivery item/date
 82663462 024 / 07/28/2020
 Order item/date
 1383582 001 / 07/21/2020
 Customer number/materialnumber
 1003432 / 3H13380



Purchase order item: 100243581 1



Material number: 3H13380



Delivery date: 07/28/2020



Delivery item: 82663462 024



Order item: 1383582 001

Made In USA

Material: 10.074.414 PCL370HR 2113 U59 38.00

IPC-4101E/98 P 98 E2113

UL Name: PCL-FRP-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16375308 310



Quantity: 500.000 YD



Expiry date: 02/23/2021



Production date: 07/28/2020

Characteristic	Method	Unit	Value	LSL	USL
Resin content AVE	IPC-TM-650 2.3.16.1	%	58.5	57.5	60.5
Minimum viscosity AVE	IPC TM 650	Pas	47.96	20.00	50.00
Flow Window AVE	Isola Internal Test Metho	s	320	300	400
Visual Inspection	-	-	Pass		

Prepreg shelf life is dependent upon storing the material in less than 23 degrees C or 73 degrees F and less than 50% RH.

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse
 Quality Manager, Isola Ridgeway Site

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:
 Insulectro
 20362 Window Drive
 Lake Forest CA 92630

Quality Certificate

Date
 07/16/2020
 Purchase order item/date
 100241739 4 / 06/30/2020
 Shipping plant
 Isola Ridgeway, USA
 Delivery item/date
 82659477 031 / 07/16/2020
 Order item/date
 1379815 004 / 06/30/2020
 Customer number/materialnumber
 1003432 / 3HH8380



Purchase order item: 100241739 4



Material number: 3HH8380



Delivery date: 07/16/2020



Delivery item: 82659477 031



Order item: 1379815 004

Made In USA

Material: 10.162.981 PCL370HR 1080 U71 38.00

IPC-4101E/98 P 98 E1080

UL Name: PCL-FRP-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16348207

310



Quantity: 500.000 YD



Expiry date: 02/10/2021



Production date: 07/15/2020

Characteristic	Method	Unit	Value	LSL	USL
Resin content AVE	IPC-TM-650 2.3.16.1	%	71.1	69.5	72.5
Minimum viscosity AVE	IPC TM 650	Pas	31.21	20.00	45.00
Flow Window AVE	Isola Internal Test Metho	s	391	300	400
Visual Inspection	-	-	Pass		

Prepreg shelf life is dependent upon storing the material in less than 23 degrees C or 73 degrees F and less than 50% RH.

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse
 Quality Manager, Isola Ridgeway Site

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:
 Insulectro/San Jose
 2345 Paragon Drive
 San Jose CA 95131

Quality Certificate

Date
 07/24/2020
 Purchase order item/date
 100242332 17 / 07/08/2020
 Shipping plant
 Isola Ridgeway, USA
 Delivery item/date
 82662829 014 / 07/24/2020
 Order item/date
 1381240 017 / 07/08/2020
 Customer number/materialnumber
 1003249 / 3H080YYY180240



Purchase order item: 100242332 17



Material number: 3H080YYY180240



Delivery date: 07/24/2020



Delivery item: 82662829 014



Order item: 1381240 017

Made In Germany

Material: 10.085.425 PCL370HR C0080 S1 S1 218 18.00X24.00

Construction: 02X2116 Grain: 24.000 " Surface: C

IPC-4101E/98 L 98 0080 S1 /S1 C C

UL Name: PCL-FR-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

Copper: IPC-4562A-WAM1

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16340840

310



Quantity: 574 PC



Production date: 07/10/2020

Characteristic	Method	Unit	Value	LSL	USL
Laminate base thickness	IPC-TM-650 2.2.18	"	0.00816	0.00710	0.00890
Peel Strength	IPC TM 650	-	Pass		
Substrate Visual Inspection	IPC-TM-650 2.1.5	-	Pass		
Thermal Stress Etched	IPC-TM-650 2.4.13.1	-	Pass		
Thermal Stress Unetched	IPC-TM-650 2.4.13.1	-	Pass		

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse
 Quality Manager, Isola Ridgeway Site

Micro Section Analysis Report

Customer	The University of Arizona			Revision	2.0
Address	1303 E University Blvd. Box 5 Tucson AZ 85719			Date Code	2040
Part Number	GUSTO-UA-DWG-00012			Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101			Work Order	422295 - 1.00

Sierra Tool Number	171652	Construction Type	Foil
Surface Finish	HAL	Number of Layers	8
Compliance to:	Master Drawing	None	
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3		

Construction		Serial Number Used:	
Layer	Specification		Actual Measurement
	Copper Weight (oz)	Nominal	
Layer 1	0.250	0.00035	0.00036
Dielectric		0.01050	0.01000
Layer 2	1.000	0.00140	0.00130
Dielectric		0.00800	0.00830
Layer 3	1.000	0.00140	0.00132
Dielectric		0.00940	0.00962
Layer 4	1.000	0.00140	0.00131
Dielectric		0.00800	0.00818
Layer 5	1.000	0.00140	0.00132
Dielectric		0.00990	0.00994
Layer 6	1.000	0.00140	0.00132
Dielectric		0.00800	0.00830
Layer 7	1.000	0.00140	0.00131
Dielectric		0.01100	0.01030
Layer 8	0.250	0.00035	0.00035
Dielectric			
Layer 9			
Dielectric			
Layer 10			
Dielectric			
Layer 11			
Dielectric			
Layer 12			
Dielectric			
Layer 13			
Dielectric			
Layer 14			
Dielectric			
Layer 15			
Dielectric			
Layer 16			
Dielectric			
Layer 17			
Dielectric			
Layer 18			
Dielectric			
Layer 19			
Dielectric			
Layer 20			
Dielectric			
Layer 21			

Compliance to the following requirements:

Structural Integrity After Thermal Stress

- 3.6.2.1 Plating integrity
- 3.6.2.3 Laminate voids
- 3.6.2.6 & 8 Etchback / negative etchback
- 3.6.2.9 Annular ring and Breakout (internal)
- 3.6.2.10 Lifted Lands
- 3.6.2.11 Hole plating thickness
- 3.6.2.15 Surface plating and conductor thickness
- 3.6.2.14 Copper foil thickness (internal)
- 3.6.2.16 Metal core spacing
- 3.6.2.17 Dielectric thickness
- 3.6.2.18 Material fill of Blind and Buried Vias

Spec:	Maximum	Minimum
	None	0.0000
Layer 1	0.0026	
Layer 8	0.0024	

Coupon	Hole Wall Thickness	
A	Hole Size	0.05510
Reading 1	0.00204	Average = 0.00216
Reading 2	0.00225	
Reading 3	0.00220	
B	Hole Size	0.03540
Reading 1	0.00182	Average = 0.00192
Reading 2	0.00204	
Reading 3	0.00190	
B2	Hole Size	0.01180
Reading 1	0.00145	Average = 0.00142
Reading 2	0.00132	
Reading 3	0.00150	

Overall Thickness	
Nominal	0.079
Minimum	0.071
Maximum	0.087
Measured	0.082
Pass/Fail	PASS

Measurement taken over:
ALL

Measurement Tool:
Optical Microscope

Solderability Test Results	
Use "S" Coupons if available	
Serial Number	Results
001	PASS
002	PASS
003	PASS
	Not Evaluated

Comments:

Report Completed by: **Arnel Fillon**

Date: October 7, 2020

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Customer Coupon Retention

Customer The University of Arizona
Address 1303 E University Blvd, Box 5 Tucson AZ 85719
Part Number GUSTO-UA-DWG-00012
Purchase Order # 559272/line 3, COIN 24101

Revision: 2.0
Date Code 2040
Base Material Isola 370 HR
Work Order 422295 - 1.00

Sierra Tool Number 171652
Number of Layers 8
Surface Finish HAL

Coupon Shipped Number 1

Date Shipped 10/7/2020

This coupon has been given to the customer upon their request. The customer is responsible for the retention of this coupon as required by all specifications and regulations. Sierra Circuits might not have any additional retention coupons.

Arnel Fillon

October 7, 2020

Inspector

Date

Attach coupon below

